THE TRANSPORT OF TIMBER AND CHARCOAL ON THE UPPER COURSE OF THE RIVER DRAVA/DRAU

PRIJEVOZ DRVA I DRVENOG UGLJENA U GORNJEM TOKU RIJEKE DRAVE

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Summary

Up to the completion of the Southern Railway Track (Südbahnstrecke) in 1871 the river Drava had a very great economic importance for Carinthia, and this for the inland trade as well as for the export to the neighboring foreign countries downstream. It was the big East-West link-up between Carinthia, Slovenia, Croatia and Hungary. In Carinthia itself it was the connection between the well wooded forest areas in the upper reaches with the regions in Lower Carinthia, which had less wood but were developed industrially, and further on with the Pannonian economic sphere. The export of wood, which can be proven already in the 14th century, underwent repeated restrictions at the end of the 18th century, when the forest devotions were abolished. Subsequently however the traffic of rafts and flat-bottomed boats (so called Plätten) flourished, supplying the iron processing enterprises in Lower Carinthia with charcoal, the sawmills in the lower reaches of the river Drava with round timber, and also the ports in the Adria with the much-demanded shipbuilding wood. With the alteration of the river Drava for the production of electricity as well as with the change from transport with rafts to that with the railway the rafting traffic on the river Drava found its end after the Second World War.

Keywords: rafting, floating, charcoal, forest harvesting, timber trade
Ključne riječi: rafting, plutajući, drveni ugljen, sječa šuma, trgovina drvom

1. INTRODUCTION

The river Drava (German *Drau*), which rises in the Toblacher field, in today's Italian South Tyrol, then flows through East Tyrol, Carinthia, Lower Styria in today's Slovenia, Croatia and Hungary and flows into the Danube at Osijek, was with a length of 749 km one of more important rivers of the Austrian Empire and southern Germany. Already in den Early Middle Ages, namely in 811, the Drava – in this context called in Latin »Drauus fluvius« – was defined by Charles the Great as the border between the dioceses Salzburg and Aquileia in the Eastern Alpine area.[1] Of all the rivers of former *Inner Austria* (*Inneröesterreich*) (Styria, Carinthia, Parts of the Slovenia of today) it had the oldest tradition of raft- and river navigation. This can mainly be attributed to the Roman settlement of Ptuj (Latin Poetovio, German Pettau) which at that time was the base of the Pannonian flotilla and an important traffic junction.[2]

Wood, being the most important natural resource of these areas, was at the same time also the most important source of income for those of the forest owners who sold the wood, and also for the rafters who transported it. The Drava was the big East-West link and allowed a rapid and reasonably priced transport

[1] *Bitschnau Martin and Obermair Hannes. 2009. Tiroler Urkundenbuch, II. Abteilung: Die Urkunden zur Geschichte des Inn-, Eisack- und Pustertals. Bd. 1 bis zum Jahr 1140.* Universitätsverlag Wagner; Innsbruck pp 55–56, Nr. 79.

[2] Leskoschek Franz 1972. Schifffahrt und Flößerei auf der Drau. Zeitschrift des Historischen Vereins für Steiermark 1872. Hg. Vereinsausschuss, Schriftführung Ferdinand Treml, Selbstverlag des Vereins: Graz, p 116. Haßler Jakob 1921. Die Floß- und Plättenschiffahrt und der Ausbau der Drau- und Möll-Wasserkräfte in Kärnten, Kärntner Landesarchiv Klagenfurt (KLA) B 579.

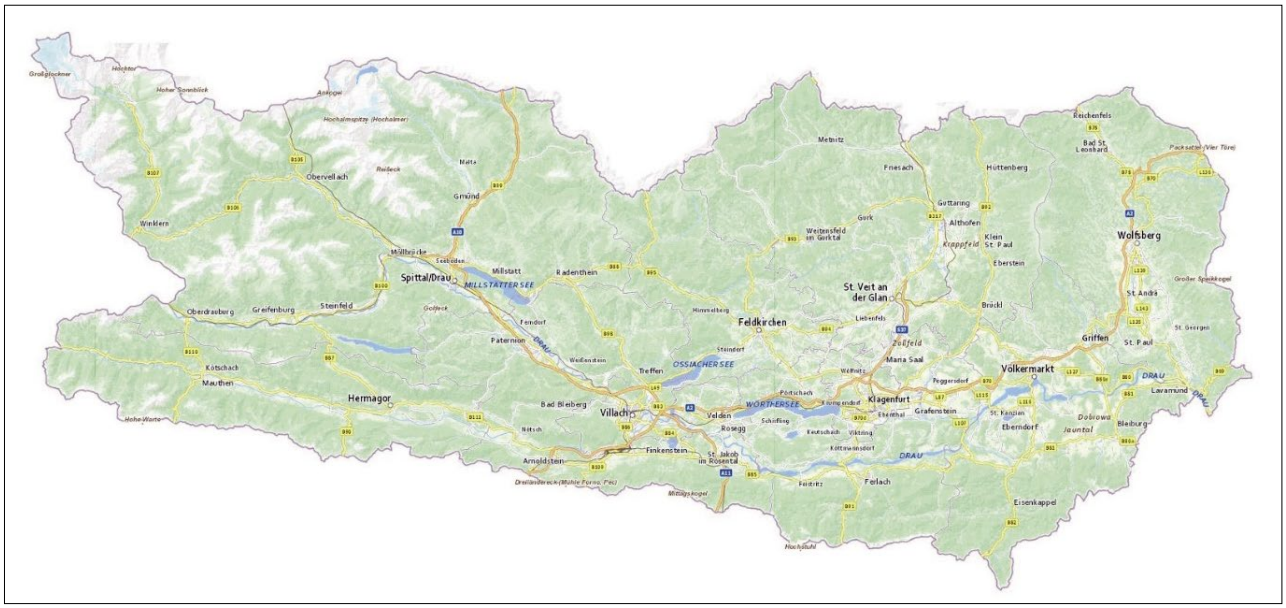

Figure 1 *The »Carinthian timber-road« (Kärntner Holzstrasse) from Oberdrauburg to Lavamünd. Source KAGIS*

of goods and people (see figure 1). This started immediately after the federal state border between the Tyrol and Carinthia at Oberdrauburg and was operated from the end of the Middle Ages onwards for 359 km on the former Austrian territory. Until the turn of the 20th century there was an active long-distance traffic on the Drava to Maribor as the destination port. Here the cargo and the wood of the rafts were either sold, or a Styrian or Hungarian crew took over the raft and drove it with a new cargo down to the mouth of the Danube. The Carinthian crew returned with horse-drawn wagons, later by train, and made a new trip with a new raft. The opening of the first Carinthian railroad line from Klagenfurt to Maribor in 1863, and later further on to Franzensfeste had dreadful results for timber rafting. Trade and traffic were directed into completely new paths by the modern railroad tracks. Besides, at the end of the 18th century already the flood control of the Drava had started in order to avoid the recurrent flooding. Originally the project had planned the continuance of the water traffic as well as the operating of power plants.[3] After 1945 the transport of wood on the water decreased recognizably and stopped completely in 1952 because of the changeover to truck traffic and the start of building power plants along the Drava. A whole chain of power plants was built and the Drava completely lost its characteristic of a river it had had in former times. There is just a track section of 55 km left, between Oberdrauburg and Spittal, as the last freely running flow line of the Drava in Austria. Today the rafting of the Upper Drava-valley (*Oberes Drautal*), because of its long history, tradition and economical and sociocultural importance, has to be seen as part of the Cultural Heritage of the region. The knowledge referring to the traditional craft technology of building rafts as well as the knowledge concerning the practices and experience related to rafting has been retained until today. In 2014 this tradition has been incorporated in the Austrian National List of the UNESCO World Cultural Heritage.

Although the history of timber and goods transport has been recalled on the occasion of its inclusion in the list, many questions remained unanswered. The present study wants to investigate under which basic conditions the transport was realized, who realized it and how. I would like to draw attention to the close link between the provision with energy (wood) and the product produced (iron), which complemented each other excellently with regard to the type of transport on the Drava (both as cargo on rafts).

[3] Haßler Jakob 1921. Die Floß- und Plättenschiffahrt und der Ausbau der Drava- und Möll-Wasserkräfte in Kärnten, Kärntner Landesarchiv Klagenfurt (KLA) B 579.

2. STUDY AREA AND MATERIAL

2.1. The water catchment area

From the years 1836[4] and 1863[5] two descriptions of the river have been preserved, from a time when the Drava was a busy and popular waterway. They give us some interesting indications about the course of the river from a time before regulations and constructions were installed. The Drava crosses the border of Carinthia about 4 km above Oberdrauburg in a distance of about 60 km to its origin in South Tyrol and traverses the country in a west-easterly direction on a length of about 230 km. The Upper Drava-valley was described as very romantic and picturesque, with dark woods of spruce and the warm green of the meadows in between, populated by solitary farms and small marketplaces as Greifenburg and Paternion, dominated by high mountains. With the exception of some insignificant hydraulic constructions erected by the municipalities, the river was left to itself. Near Greifenburg the Drava began to be navigable, but only a drive downstream was possible, as no towpaths existed and the river had too many branches in many places. It was used by rafts as well as by flat-bottomed boats, so called *Plätten*, but there were shallow areas which at low water hindering the cruise. Depending on the water level both types of vessels needed one to two hours for one mile (7,58 km). In the district of Villach the Drava passed 88 villages, castles and estates, in the district of Klagenfurt 30 villages within a distance of 12 miles.

On its way through Carinthia the Drava on both banks incorporates larger and smaller mountain torrents, of which in Upper Carinthia on the left bank the streams Möll and Lieser, on the right bank the river Gail provide the largest amount of water, in Lower Carinthia on the right bank the torrents Feistritzbach, Loiblbach, Waidischbach, Freibach and Vellach, on the left bank the rivers Gurk, Görtschitz, Glan and Lavant. Except shortly before the marketplace Sachsenburg in Upper Carinthia the Drava had no special windings, but frequently changed its river bed, partly because of its strong gradient, but partly also because of the substantial silting, caused by the many mountain torrents. It frequently split into several arms, formed many sand bars and several bigger islands which subsequently were washed away again. Because of the many community bridges, which could pass neither flat boats nor rafts, the Drava became navigable only at Flaschberg, in the district Greifenburg in Upper Carinthia. But especially from Greifenburg, and even more from Villach onwards the shipping of wood products, manufactured products of the iron industry, colonial goods, furniture and passengers was very lively (see figure 2).

There were many spiky rocks to make the journey dangerous and only possible at high water levels. The leaders of the flat boats named as especially dangerous: the river stretches at Dürnbach in the district Rosegg, upriver from Rosegg at the Church St. Martin, at Edling downriver from Völkermarkt, at the so called devils bridge near the iron processing industry Lippitzbach, upriver Schwabegg and Lavamünd, were the rocks stood so close together that the boats could hardly pass and at Lavamünd itself. Without these obstacles the Drava would have been navigable for 7 months and could have carried considerably more cargos.[6]

The floods were also an obstacle for the navigation on the Drava. The melting in spring and the sometimes very long rainy periods in autumn made the water level rise to flood the banks, so that the timber, which had been stored there, was carried away. Such floods were repeatedly registered in the chronicles from the year 710 onwards. Changes in the river course caused floods or silting up and often also a new waterway for rafting. Old remains from former bridge piers in the marshy old riverbed testified this. Ferry stations, which had been very frequent up to middle of the 20th century had to be relo-

[4] Schreiner G. F. 1836. Drava. In: Allgemeine Encyklopädie der Wissenschaften und Künste in alphabetischer Folge von genannten Schriftstellern bearbeitet und herausgegeben von JS Ersch und JG Gruber.27. Teil, F. A. Brockhaus: Leipzig.

[5] Hermanitz Thomas 1865. Die Drau und ihr Flussgebiet. Carinthia 55. Jg. 1865, Verlag Kleinmayr: Klagenfurt: pp 320-323.

[6] Scheließnig Jakob 1842. Der Draustrom und seine kommerzielle Wichtigkeit für Kärnten. In: Carinthia 32. Jg. 1842, Verlag Kleinmayr: Klagenfurt: p 182.

Figure 2 *Map of the Upper valley of the river Drava and Möll-valley (Mölltal) 18th century. Source: HKA Wien, Kartensammlung: PB 10.*

cated, and the capacities of the ferries hereby could be changed. But still ferries were less expensive in maintenance than bridges. That was the reason why especially the section from Villach to Völkermarkt, where up to the 18th century only one bridge, namely at the castle Hollenburg, existed and later on supplemented with an additional bridge at Sager (*Annabrücke*), was mainly served by ferries.[7] In the middle of the 19th century there were more bridges available to carry heavy loads.[8] In the 19th century the former, presumably rich, fish population, as for instance was still witnessed by retainers of the dominium Hollenburg in the riverbed at Glainach, had dwindled severely.

Downriver Lavamünd for part of the way the right bank of the Drava formed the frontier to Slovenia and traversed subsequently Lower Styria. The mighty ridge of the high Bachern Range now formed the right riverbank until Maribor. The river was torrential, its bed not advantageous for navigation, as several rocks on the banks and in the riverbed itself demanded extreme attention. In order to bring the vehicles safely past, the dangers of the rocks and plates were reduced in 1818 and 1819 by the combined efforts of the State and the estates at a high cost, for which a water toll was introduced for every flat ship and raft at Maribor. In Lower Styria the traffic on the water was described as rather lively. In Maribor and Ptuj around 1830 an average of 250 rafts with fuel wood were unloaded annually, further 100 smaller rafts or flat boats, loaded with shingles, planks, beams, well pipes, poles and other timber, which partly went from there further on to Varazdin, and about 30 rafts with trunks without loads, then about 25 rafts which were tied together loaded with vine stakes, which were partly transported to the vine cultivating areas of Hungary and Croatia. Already downriver Ptuj, but still more downwards from Zavrc along the Croatian/Styrian border, the Drava was flowing in many arms, formed multiple islands and because of that it became so shallow that navigation was endangered when the water level was low. At Legrad it joins the Mur, at Osijek it empties into the Danube (Donau) and passing Belgrad it flows down to the Black Sea.

In its lower reaches the banks were well wooded, often marshy, and the riverbed sandy or covered with gravel. In the lower reaches of the Drava the rafting often was endangered by the many turnings of the riverbed, by the large trunks lying frequently in the fairway, by the ship-mills, the sandbars, the many cutoff pools and by the increasing shallower shipping channel. Because of the lack of tow paths driving upstream was impossible.[9]

7 BERCHTOLD Martina and ENTER Brigitte 1998. Die Drava ist ihre eigene Frau. Slowenischer Kulturverband Strau: p 6.
8 Hermanitz, Die Drava und ihr Flussgebiet, p 322.
9 Schreiner 1836, Drava.

2.2. Sources

The paper is based on existing literature, contemporary technical essays and archive material, which are accessible at the Carinthian Country Archive (*Kärntner Landesarchiv*) Klagenfurt and the Court Chamber Archive (*Hofkammerarchiv*) Vienna. In this context particularly the publication of Franz Leskoschek from the year 1972 has to be mentioned, who in his paper *Schiffahrt und Flößerei auf der Drau (Navigation and rafting on the Drava)* paints for the first time a comprehensive picture of the Drava as a waterway.[10] Even though an essential part of the paper concerns the Slovenian section of the river Drava it contains many references to the Carinthian part. In addition to this in his paper *Die Drauflößer (The rafters on the Drava)* he depicts working life and traditions of this trade, which is extinct today. References to the upper course of the Drava can be found in this paper as well.[11] The paper of O. Moser *Von den Drautaler Flößern (About the rafters from the Drava Valley)* provides as well information concerning working life and working tools of the rafters, referring to the notes and sketches assembled by A. Liebenwein.[12] The study published by Jakob Scheließnig in 1842 about the river Drava and its economical relevance[13] is an important commentary of a contemporary witness as well as is the study by Jakob Haßler, published in the course of the planned expansion of power stations on Drava and Möll.[14] Further references were taken from the anthology *Kärntens Gewerbliche Wirtschaft (Carinthia's Trade and Industry)*.[15] The research was amplified by different case studies to be able to depict the allocation of wood by the forest owners and the organization of wood transport to the different consumers as well as the further way of the cargos. Sources concerning the allocation of wood can be found in the archive of the Forest Administration *Lainach* and the Carinthia Country Archive for the *Dominium Paternion* and *Dominium Porcia*. Reports concerning the water transport on the Drava are kept in the economy records of the *Dominium Dietrichstein* and in the Archive *Graf Egger'sche Gewerkschaft St. Georgen/Längsee*. References to the organization of timber purchasing and timber transport by iron processing plants as bulk buyers are taken from the records concerning the Archive *Gewerkschaft Lippitzbach* of the *Dominium Ehrenegg.*

3. RAFTING, NAVIGATION AND FLOATING OF TIMBER

The earliest verification of freight traffic on the Drava based on documents dates from 1209. In a charter the Drava port of the city Varazdin was mentioned. The earliest testimony for the rafting is a charter from Völkermarkt, carrying the town seal, from 1280.[16] It was about the exemption from the toll for empty vine barrels, which the monastery Viktring sent on rafts on the Drava to Maribor, passing under the bridge at Völkermarkt. From the late Middle Ages onwards until Early Capitalism the two Drava cities Ptuj and Villach had a special importance as locations for long distance trade for the freight traffic on the Drava. A more prominent role had Villach, where the age-old main road from Friuli to the middle part of the Danube crossed the Drava.

The rafting on the Drava started at Oberdrauburg and was carried out for a length of 359 km on the former Austrian territory. At the beginning of the 20th century the Drava in Carinthia was divided into two independent rafting routes: the rafting route of Upper Carinthia from the country border to Tyrol

[10] Leskoschek, 1972. Schiffahrt und Flößerei auf der Drau, pp 115-152.

[11] Leskoschek Franz 1973. Die Drauflößer. Arbeitsleben und Brauchtum dieses heute erloschenen Gewerbes Zeitschrift des Historischen Vereins für Steiermark. Hg Vereinsaussschuss, Schriftführung Ferdinand Treml, Selbstverlag des Vereins: Graz: pp 203-227.

[12] Moser Oskar 1972. Von den Drautaler Flößern. Arbeitsleben und Arbeitsgerät eines erloschenen heimischen Gewerbes nach Aufzeichnungen und Skizzen von A. Liebenwein. Monatsschrift der Kärntner Landsmannschaft, Klagenfurt Jg. 1972, Heft 6 und 7.

[13] Scheließig 1842, Der Draustrom.

[14] Haßler, J., 1921. Die Floß- und Plättenschiffahrt: p 4.

[15] Kammer der gewerblichen Wirtschaft in Kärnten (Hg.) 1953: Kärntens gewerbliche Wirtschaft von der Urzeit bis zur Gegenwart, Verlag Joh. Leon Sen: Klagenfurt.

[16] Kammer der gewerblichen Wirtschaft in Kärnten 1953, Kärntens gewerbliche Wirtschaft: p 53.

down to the mouth of the Gail, and the route in Lower Carinthia between Rosegg and the Styrian border, which continued in the Slovenia of today. From the Upper Drava the rafts mainly went to Spittal. Together with those which came down the Möll they accounted for the highest traffic density before Spittal, with 1125 rafts in 1907 and 607 rafts in 1908. As a result of the wood consumption in the vicinity of Spittal the traffic density decreased sharply from the mouth of the Lieser, but then increased again from Mauthbrücken to Feistritz an der Drau. Part of the wood went on downriver to Villach and St. Magdalen. Here in 1907 790 rafts and in 1908 486 rafts were landed. Downriver, rafts were mainly tied at St. Jakob im Rosental, which were mostly destined for Maribor, but partly going further on downstream.[17] The regular rafting traffic only started again at Glainach, increasing continually down to Lavamünd, only to decrease again from the landing in Dravograd onwards.[18]

3.1. Wood export and timber trade between prohibition and promotion

As the revenue from the sovereign-owned mines since the 15th century covered a large part of government spending, the state always tried to do everything possible to ensure its preservation and prosperity. All the relevant laws and regulations were oriented in this direction. While concerning iron products foreign countries were the most important market for the domestic industry, the state opposed the export of wood in every possible way. The timber trade with Italy therefore was a thorn in the side of the state and its efforts constantly aimed at reducing this export, if not prohibiting it altogether.

As early as the 17th and 18th centuries logs, sawn timber and even firewood were exported from Upper Carinthia, on the one hand to water on the Drava to Slovenia, Croatia and Hungary, on the other hand on the water to Villach and after reloading on axle via Pontafel either to Venice or Trieste. Yet exports did not reach the great extent of the late 18th, 19th and 20th centuries. By laws and regulations, wood was released for export only from locally specified forest areas and only under certain conditions. Either borderline forests could be cut by foreign trade companies or forests that were not favored by neighboring mines, forges or hammermills, since they were already supplied with fuel far beyond their own requirements. But a case like this was very rare and if it happened, then only in the well wooded and poorer Upper Carinthia which had relatively few mining industries. Here it was the Dominium Porcia which in the 17th century completed a series of wood clearing contracts with Italian companies, as for instance in the years 1687, 1689 and 1696. At the same time the dominium often had to controvert the protests and complaints of the neighbouring wood-demanding industries. In addition to other details, these contracts specified exactly which traffic routes and, especially, under which conditions they could be used. The timber merchants bought wood cutting areas as a whole for lump sums or stock interest of 0.8 to 2.3 cruisers for the cubic foot (25 to 71 Kreutzer per m^3) of spruce and 1.4 Kreutzer for the cubic foot (44 Kreutzer per m^3) of larch wood and usually processed the commercial bole to saw logs.[19]

In 1750 the wood export from Carinthia was still more aggravated by a circular, which was dispatched to the forest owners by the Imperial Royal Representation and Chamber via the district department. As the export of wood from Upper Carinthia to the Venetian region had increased considerably in the last years, not only the villages and properties suffered repeatedly from dangerous floods, which in the opinion of the authorities had their reason in the frequent over exploitation of the forest stands, but also the forges, furnaces and hammermills in the vicinity had to feel the shortage of charcoal. Therefore, no contract, under no pretext, should be concluded about the felling of forest resources and the export of wood before the authorities had been informed in advance and had issued a positive statement. Considering that there could be a local wood shortage in the mining regions of Carinthia, Maria Theresia proclaimed another decree on April 24th, 1759, in which the sale of wood and charcoal

[17] Moser, Von den Drautaler Flößern: Heft 6 und 7.

[18] Haßler 1921, Die Floß- und Plättenschiffahrt: p 4.

[19] Johann, Elisabeth 1968. Geschichte der Waldnutzung in Kärnten unter dem Einfluss der Berg-, Hütten- und Hammerwerke. Archiv für vaterländische Geschichte und Topographie, 63. Bd., Klagenfurt, pp 110-111.

to foreign countries was banned under penalty.[20] Nevertheless, in the following years again and again different dominions (including Bamberg and Porcia) were accused by the imperial royal forest ranger in Upper Carinthia Johann Constantin von Aichenegg, because they had sold wood to Italian traders.[21] Repeatedly, as for instance in 1767, the mining judge in Großkirchheim and wood master in the Möll-valley pronounced the ban by the threat of punishment to cut wood in the sovereign high and black forests in the Dominium Falkenstein without permission, to process it to boards and to sell it subsequently to Venetian wood traders.[22]

Concerning the timber exported to Lower Styria on the Drava, there was less concern, especially as the export fees were paid. In Dravograd there was not even a copy of the export ban, it was also completely unknown to the officials working there.[23] Nevertheless in 1770 a renewed request reached the Supreme Mining office *(Obristbergmeisteramt)* to be allowed to export different kinds of wood and charcoal on the river Drava to Styria, and in this context also the request, whether the timber export decree from 1759 was still binding, where it was said that without mining-related export permission passes no wood was allowed to be exported, and also, whether the term »out of the country« referred to Styria too. In its reply letter the office emphasized the awkward situation of woodland in Carinthia and that it was very necessary to supply the furnaces and forges working in the country with the demanded charcoal. Therefore, before exporting, it had to be examined where the wood came from and to what extent the requested timber export was permissible and did not harm the population.[24]

As late as 1784 the ban on timber exports was reiterated. The forest owners were allowed to freely use and sell their wood and produced charcoal due to the abolition of the sovereign mining forest preserve (*Montanforstreservat*) 1783, but this was only the restriction of the sale of certain customers and a fixed price lifted. From this the authorities deduced, that for the curtailment of the local industry it was not allowed, to drag wood and charcoal out of the country. Therefore, the existing ban on the export of wood and charcoal remained, unless the government gave permission to do so (on presentation of the varieties and quantities intended for export).[25]

But only a year later it was announced by a court decree that from now on anyone who felt like it, was allowed to trade timber by land and water. It was also allowed to carry the wood with one's own boats wherever one wanted.[26] A further simplification concerning the timber trade was the cancellation of the taxation of the price of wood, of floating and of cartage *(Holzpreis-, Schwemm- und Fuhrlohntaxierung)* by Joseph II. from the 2nd of July 1787.[27] The timber trade should now be made by a voluntary and arbitrary agreement between the parties acting together.[28] In 1845, by means of a Court Chamber Decree of 15 January, new provisions concerning the import and export of wood, charcoal and cereals were adopted by the tax authorities (*Cameral-Gefällen-Verwaltungen*) for granting the export and import of the said products authorized under certain conditions.[29]

3.2. Transport on the water

Already in 1403, the citizens of Gmünd carried their iron to Spittal. From there the citizens of Spittal, who at that time were the only ones who had the right of rafting on the river, rafted it on the waterway to Villach. The city of Villach also wanted to participate in the revenues of the trade of wood

[20] Hofkammerarchiv (HKA) Wien: Münz- und Bergwesen, Nr. 1485, fol. 1099.
[21] Johann, 1968, Geschichte der Waldnutzung, pp 179-181.
[22] KÄRNTNER LANDESARCHIV KLAGENFURT (KLA): k.k. Finanzprokuratur, C Akten, Fasz. 300.
[23] HKA Wien, 31. Bankalakten, Fasz. 7, Nr. 1209, fol 52.
[24] HKA Wien: 31. Bankalakten, Fasz. 7/2, fol.38.
[25] KLA: K.K. Finanzprokuratur I, Fasz. XXIX.
[26] Kropatschek, Joseph 1847. Vollständige Sammlung aller im politischen Cameral- und Justizfache unter der Regierung seiner k.k. Maj. Kaiser Ferdinand I in den k.k. Staaten erlassenen Gesetze und Verordnungen. 8. Bd., Franz X. Pichl (ed.): Wien, p 234.
[27] KLA: Finanzdirektion Klagenfurt, Rechnungsdepartement, A 1594.
[28] KLA: Finanzdirektion Klagenfurt, Rechnungsdepartement, Schachtel 38.
[29] Kropatschek 1847, Vollständige Sammlung, 11. Bd.: p 7.

and the transport. In 1490 Emperor Friedrich III handed over the rafting toll at Villach to Matthias Rainer, and in 1494 Bernhard Grabuck was granted the toll for floorboards for his lifetime by Emperor Maximilian. Already two years earlier, in 1492, the shipping on the Drava had been reorganized by Emperor Friedrich for the promotion of the general benefit (*»zur Förderung des gemeinen Nutzens«),* in putting some money from his own pocket at the disposal of the councilors and citizens to enable them to repair the paths for horses so that the flat boats could be pulled upstream. However, since it needed more money and manpower to navigate the Drava with ships, Emperor Frederick wanted to call as well on the cities, markets, and farms situated at the banks of the Drava for the payment of the costs and robotic power. Obervellach for instance was allotted 15 pound to deliver at the administrator at Gurnitz, which then were used for the repair work at the river.[30] Villach was not only a trans-shipment center for all kinds of wood such as logs, saw timber, floor boards, boards, firewood and charcoal but also for a multitude of other goods carried as freight on the rafts and flat boats, such as lead, mercury, iron and iron products, or cloth, which around 1500 was bought by tradesmen of Ptuj at Frankfurt and transported via Salzburg to Villach and the Drava to Maribor and further on to Hungary and Turkey, for which route in 1498 a toll of 2 Guldens per raft had to be paid at Ptuj. Part of the merchandises having been obtained from Venice also were reloaded at Villach and transported on rafts down the Drava.[31]

3.2.1. The route

The shipping with flat boats and the rafting connected Oberdrauburg with Spittal, Maribor and Osijek without official complications. Previously these towns only could be reached by stagecoaches or horse-drawn carriages, and the transport of timber, coal and ore was nearly not manageable over land. Most of them were independent rafting masters, who carried out the transport as a trade on the basis of contracts. For larger or long-term assignments, they occasionally leased land at the Drava, as for instance in 1819 the master of rafts Poy from Villach at the bridge at Hollenburg, to have a place for landing, loading and unloading of the rafts and boats for the sole use of his company available.[32] The first raftsmen came from the Piave, and were later also often Italian, while the shipping with flat boats was conducted by local farmers.[33] The steering of boats was more dangerous, as they were fragile like an eggshell.

Usually the rafting on the Drava started at Easter and went on till the end of November.[34] In summer with well navigable water the rafts and boats needed two and a half days to Maribor; the first stop for the night was Hollenburg (inn Scheriau at the left bank), the second Lavamünd; on the third at midday Maribor was already reached. They drove from the break of day until the evening.[35] At Maribor the cargo and the wood of the raft were sold, or a Styrian or Hungarian crew took over the raft and drove it with a new cargo down to the mouth of the Danube. But the Carinthiana returned on foot or with horse drawn carriages, or after 1870 by railway to Villach, and from there with heavy back packs by foot back to Oberdrauburg. At lively times the same crew did the cruise Oberdrauburg – Maribor twice a week (see figure 3).

As at those times the Drava was not confined by banks it repeatedly happened, that rafts or flat boats drove against sandbars and then had to be stemmed from the bank by the raftsmen. That was the reason why they always started in pairs from Oberdrauburg, to be able to help each other. There were also convoys with 20 boats and six to eight rafts. At the Hollenburg Drava bridge it repeatedly came to accidents, as gravel banks caused running aground. Because of this on the of September 20th, 1833 the district

30 Wiessner Hermann 1956-1968: Monumenta Historica Ducatus Carinthiae, 11. Bd., Kärntner Landesarchiv: Klagenfurt, Nr. 660.
31 Leskoschek 1972, Schifffahrt und Flößerei, pp 119-120.
32 KLA: Archiv Dietrichsein, Schachtel 291, CCLVII 34/147
33 Zeloth Thomas 2010. Wirtschaft und Gesellschaft in der Marktgemeinde Steinfeld seit dem MIttelaltler. In: Claudia Fräss-Ehrfeld und Thomas Zeloth (ed), Steinfeld Geschichte. Verlag des Geschichtsvereins: Klagenfurt: pp 101-164.
34 Moser, 1972, Von den Dravataler Flößern, Heft 6 und 7.
35 Haßler, 1921. Die Floß- und Plättenschiffahrt: p 6.

Figure 3 *Rafting at the first decades of the 20th century. Source: Johann Kuhn 2009. Geschichte der Floß- und Plättenschifffahrt auf der Drau.*

office decreed that the dangerous spots should be marked by experienced skippers.[36] The worst and most dangerous spot was the Anna-bridge (*Annabrücke*) at the road from Grafenstein to Eisenkappel. The driving crew of both six-man vessels were required to safely steer the boat or raft under the bridge.[37]

The floods, caused by the Drava, as e.g. in 1851 and 1882 had devastating effects, acres were ruined, bridges and other buildings destroyed, people injured and killed. After the high flood in 1882 the first methodical regulations of the Drava were resolved on and started. On the later regulated Drava the largest ship in service of the Drava Regulation needed only a front oarsman (*»Vorfahrer«)* and a back oarsman *(»Nachzieher«)* to pass calmly and with gusto under the former so dangerous Anna-bride. The raft crews also could be reduced to three or four rafters. The upgrading of the Drava as a waterway, which had been suggested in 1842 by Jakob Scheließnig as a connection to the railroad to Trieste remained undone.[38] But still, until the beginning of the 20th century, between Glainach and Dravograd the Drava was one of the most frequented river stretches in Carinthia.

3.2.2. Size and construction of rafts and flat boats (so-called Plätten)

In contrast to the Styrian rafts on the Drava, which were mainly meant for long distance travel, the rafts built in Upper Carinthia were almost one-third smaller. They were mainly intended for timber transport within Carinthia.

At the beginning of the 20th century a large part of the rafts came from the river Möll. There, the rafts had four panels each of 4.3 m length which were lined up in a row. On the Drava these rafts continued unchanged. If rafts were tied on the Drava, they had five panels They could also carry a heavier freight. Both raft types had a width of 4.5 m. 10 to 15 sawmill logs were bound into one panel. Instead of willow rods also iron ring hooks were used for connecting the panels, which were driven into the ends of the canes and connected with cables (see figure 5). On the manufactured raft decks on the Möll rafts 20 to 50, on the Drava rafts 129 to 140 sawmill logs could be loaded, depending on the water level. Therefore, the Möll rafts carried a wood quantum of 25 cubic meters, the Drava rafts one of 30 to 45 cubic meters. At low water level the freight had to be omitted.[39] With normal load the rafts had measurements as follows:

On the Möll: length 17.2 m, width 4.5 m, immersion 30 to 40 cm, quantum of wood 25 m³

On the Drava: length 21.5 m, width 4.5 m, immersion 30 to 50 cm, quantum of wood 30 to 45 m³

[36] KLA Archiv Dietrichsein, Schachtel 291, CCLVII 34/147

[37] Haßler, 1921. Die Floß- und Plättenschiffahrt, p 7.

[38] Scheließnig. 1842. Der Draustrom und seine kommerzielle Wichtigkeit, p 182.

[39] Moser, 1972, Von den Drautaler Flößern, Heft 6: 5.

For rowing pols of medium strength were used, made of spruce, which should be as uniformly strong as possible. The thinner end had about 11 cm, the thicker one 15 cm. The oar plank was of spruce as well, but it did not always have the same shape. The willow braid was fixed with wooden wedges so that the oar was fastened. To hinder the oars from screaming the collar was lubricated with water. The rowing technique was a strong, continuous pull.[40] Usually the rafts had two oars in front and one in the back. The crew of a raft on the Möll amounted to at least 4, but usually 5 men, on the Drava to 2 to 3 men. In 1910 a front oarsmen (on the Möll usually two, on the Drava just one per raft) got as wages 6 to 7 Kronen, a rafter 5 to 6 Kronen, an unskilled worker or learner 3 to 4 Kronen.[41] The rafts which were built on the Drava bank in the Rosental near St. Margareten/Glainach were a little larger (length 32 m, width 5 m), so an extended crew was required.[42]

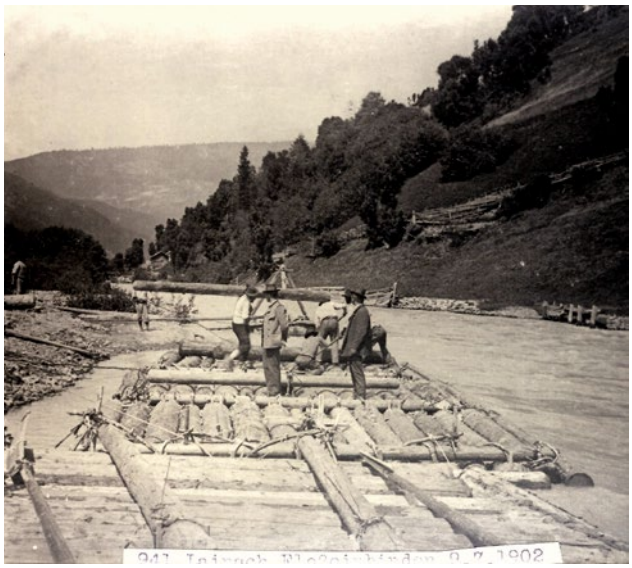

Figure 4 *Raft on the river Möll 1902 (Source: Archive of the Forest enterprise Lainach)*

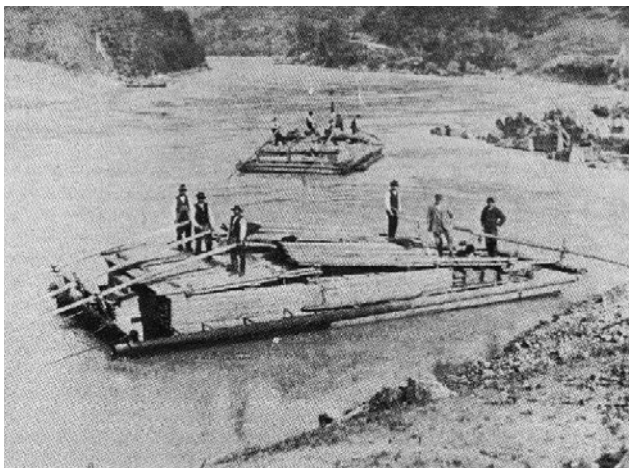

Figure 5 *Flat bottom boat (so-called Plätte) on the river Drava. Source: Johann Kuhn 2009. Geschichte der Floß- und Plättenschifffahrt auf der Drau.*

The rafts were mainly used for transport of wood and goods, but the flat boats were a popular means of transportation for travelers and luggage. Just made from planks, bound with 3 frames and caulked with chippings and moss the flat ship or so-called *Plätte* was 12 m long, 4.5 m wide, 1 m high and could be loaded with 27 to 33 tons (see figure 5). During the time when rafts and boats were used, at the so called Pontiller-shipyard at Oberdrauburg every day a flat boat was built. The production of these ships was so to speak a cottage industry of the Upper Drava-valley. The boat planks, 40 to 50 cm thick, were supplied by the nearest sawmills, the crooked wood for the ribs of the boat was brought by neighboring farmers, and the moss for waterproofing the gaps by the women. The wooden strips for caulking the gaps were split at the shipyard itself, and the boat clamps, necessary to fix the strips, were produced by machine in the Drava-valley plants. At the final destination Maribor, they were sold and used for the further transport of goods down to Osijek. For a trip from Oberdrauburg to Maribor including the way back the shipping wages were as follows: A front oarsman got 18 Gulden, a back oarsman (steersman) 16 Gulden, and each of the four raft- or ship servants 14 Gulden.[43] Thus they were much better paid than the rafters.

[40] Moser, 1972, Von den Drautaler Flößern, Heft 7: 8-10.
[41] Moser, 1972, Von den Drautaler Flößern, Heft 6: 7.
[42] Johann Elisabeth 2004. Wald und Mensch. Die Nationalparkregion Hohe Tauern (Kärnten). Verlag des Kärntner Landesarchivs: Klagenfurt pp 428-450.
[43] Haßler, 1921. Die Floß- und Plättenschiffahrt: p 7.

3.3. The economical relevance

Already in the 16th/17th century the traffic of boats and rafts on the Drava must have been rather important, because on August 7th, 1601, Archduke Ferdinand of Austria demanded from the lordships 40 to 50 people who were proficient in navigation for his planned warfare against the Turks, *(»as there were plenty of skippers and rafters at the river Drava«).* For this purpose, the administrator of the Dominium Paternion had to report to the president of the country the raftsmen known to him from Paternion to Völkermarkt. To transport the supplies, Archduke Ferdinand expected at least the provision of 200 rafts and 40 particular boats so-called *Scheiken* and all their belongings. They should be built within two months and delivered to Ptuj.[44] Lastly the demand could not be met, as indeed there was wood, but the iron parts necessary for the construction could not be procured for lack of money. The Drava rafting attained great importance in the Ottoman war of Prince Eugen, as on this way weapons, ammunition and comestibles were delivered from Carinthia. It was also used for the transport of troops.[45] Rafting was extremely important for both the timber industry and the iron industry, as charcoal was the only source of energy. Wood was cut in the wooded and industrially poor Upper Carinthia on the slopes of the Drava- and Möll-valley and also in canyons aside and was brought to the river in great amounts. Although up to the First World War the rafting was mostly carried out by timber merchants some works and cellulose enterprises rafted autonomously the purchased wood and charcoal. Most of the wood, and even the best qualities, was used for the production of energy for the Carinthian iron industry.

3.3.1. Floating of wood to the state-owned zinc works at Dellach and the floating trial for the wood supply of the blast furnace at Treibach of Count Franz Egger[46]

In the Dominium Oberdrauburg already in the 17th century a dam made it possible to float wood from the Pirkner canyon to the Drava. The wood derived from the surrounding forest and the floating was continued until the forest was entirely cut. The floated wood covered the demand of the imperial zinc work, which in 1803 again was allowed to use the forest for its wood supply. The wood foreman in charge had to produce 1200 fathoms of pieces of wood of a length between 1,2 and 1,5 m (*Holzdreilinge),* (about 8000 m³), and to float this wood with the help of a dam, which had been built for this purpose, out from the canyon and downriver the Drava to the imperial zinc work at the bridge at Dellach. Depending on the weather conditions the months March or beginning of April were designated for this. At the zinc work only a movable piling boom was installed which could be removed again after the floating. The required storage boom and wood yard should be placed at disposal by the Dominium of Greifenburg. To avoid damages at the banks by flooding (in the bed of the stream much gravel had amassed) a construction with larch stems should be established on both sides of the canyon, from the beginning down to the bank of the Drava at a length 600 fathoms (more than 1 km). The piling boom should stop the wood and guide it into a channel which had gates. This channel had to be so big that it could take up several thousands stackead cubicmeters of wood, and it should be in such a far distant from the Drava that no danger of flooding could be feared. With the adjacent neighborhood of Pirkach and the dominium an agreement was made about the place where the wood should be stored and it was promised to float only at low water level. Under these conditions the district office allowed the floating. At no time too much wood should be put into the water. After the floating possible damages should be looked for and recompensed (see figure 6).

From 1803 onwards for 16 years floating was done once or twice a year. Count Franz Egger also took part in this joint venture to supply his blast furnaces and forges in Treibach in Lower Carinthia.

[44] KLA: Herrschaft Paternion, Schachtel 108/195.
[45] Leskoschek 1972, Schiffahrt und Flößerei, pp 128.
[46] KLA: Graf Eggersche Gewerkschaften St. Georgen a. L., Fasz. CXVII, Nr. 141, Holzschwemmung auf der Drava in Oberkärnten 1805-1852.

Figure 6 *Piling boom and dam to storage the rafted timber on the bank of the river Drava in the Dominium Greifenburg, (Oberdrauburg). Source: Franziszeischer Kataster around 1825.*

After the acquisition of the rights of use of the Pirker forest in 1806, which had belonged to the imperial zinc work before, Egger now had at his disposal 14.000 stacked cubic meter of wood (9600 m³) per year.

During this time there were no complaints, though some bridges had to be passed of which some were very narrow. The floating was done in early spring and in autumn. The floated wood war carbonized at the zinc work and then shipped on flat boats to the bridge at the Hollenburg, where it was landed and stored for further use in a storehouse for charcoal, which had been built there with official approval in 1803. The disadvantage of this wide transport of charcoal was a considerable abrasion and so loss of fuel by the loading and unloading of the boats. Occasionally the charcoal also got very wet. It also happened that vessels capsized. In 1822, as the Drava after heavy rain at Steinfeld again found a new waterway, Count Egger wanted to know who was responsible for the maintenance of the bridge or the waterway and who was obliged to repair them, as repeatedly at this bridge boats with whole loadings of 300 tubs of charcoal were destroyed. But according to the opinion of the administation office neither the manor nor the borough Steinfeld could be committed to the upkeep of the waterway and to keep the fairway free, but that this was the duty of those who used the Drava as waterway.

To make the transport less dangerous, possibly less expensive and particularly to be able to do it faster, in 1823 the iron and steel works of Treibach undertook a pilot trial to float the wood downriver to the bridge at Hollenburg. In the evaluation damages concerning the riverbanks as well as the bridges should bee taken into account for future planning. The wood should be collected by a moving boom stretched diagonally over the Drava. Any rafting eventually taking place during this time should not be hindered. By the time of the season, when you could drive again with flat boats, the boom should have already been pulled off the water.

Forest harvesting for this trial was carried out in January and February 1823 in the Pirker canyon and at Flaschberg. The wood was cut on the slopes of the canyon and after the brook was dammed was floated to the Drava and subsequently on the Drava to the moving boom at the Hollenburg, where it was taken ashore. With the cleaving, the transport and the throwing in of the wood 113 workers were employed, who worked a different number of shifts (28 to 2 worked shifts) with a wage which amounted on the average to 30 Kreutzer per shift (27 to at the most 51 worked shifts). There were also 8 carters (between 8 and 23 shifts). The overall costs amounted to 758 Gulden 7 ½ Kreutzer. In addition, wardens at the bridges and carpenters had to be employed too. Even only down to Spittal there were 11 bridges which had to be taken care of, down to Villach a further 6.

The floating of the wood was carried out in February and March and went on all in all for 70 days. Nearly 7,000 stacked cubic meters (4900 m3) of wood were flooded, consisting of round and cleft timber of 1.5 to 2 meters in length. In March the wood was pulled off the water, where the workers received 30 Kreutzer per shift (rendered shifts between 7 and 16). 172 workers were required, moreover 38 carters (between 28 and 6 shifts) who had to handle the transport with horse or oxen drawn carriages to the works at Treibach. Altogether the costs of the pulling off the water and transport of the wood amounted

to 1047 Gulden 32 Kreutzer. Overall the trial to procure the charcoal supply at Treibach from areas upstream the Drava amounted to 3934 Gulden 50 Kreutzer. The catering for the master of the rafts Jakob Jakl of 210 Gulden (3 Gulden per day) had to be added as well as the fodder for his horse of 42 Gulden (36 Kreutzer per day). All in all, the costs were rather high, but the transport could be done in the shortest possible time. The request of Count Egger to be allowed to continue the floating down to the Hollenburg for the benefit of his iron works was not authorized by the county office, even though provably no damages to bridges or banks had occurred. However, protests came from most of the shore communities of the district Paternion. They feared that floating would be carried out also at higher water level, and that at different conditions damages to bridges and river bank constructions could happen. They also were afraid that rafts with wood or charcoal would be hindered by the floating, which were able also to pass at low water level. The county office also was annoyed because the boom at the bridge at the Hollenburg had been erected without official consent, i.e. without previous request and subsequent consent. Thus there was just this trial and the wood was still either carbonized at Oberdrauburg and then shipped to the Hollenburg with flat boats, or the wood was rafted and carbonized after bringing it ashore at the Hollenburg.[47]

3.3.2 Charcoal to the iron industry of Count Ferdinand Egger at Lippitzbach

Charcoal, which could be floated or rafted on the river, was very welcome at the Lippitzbach rolling plant and iron forge located on the banks of the Drava because of its low transport costs and easy transportation. In 1845, based of a contract about 3000 tubs charcoal was purchased at Upper Carinthia, in fact at Greifenburg. By order of the industry the wood had been carbonized by residents from Stein, then transported to the Drava, taken over by the senior forestry official and stored there. Franz Orantsch, the accountant from Lippitzbach, assumed that for the transport of the wood 10 to 12 flat boats would be necessary, which the factory could buy and easily sell again later. However, as they could not get the boats at Greifenburg, the transport was carried out as freight on rafts in 1846. For this purpose, they first had to buy timber for rafts which they obtained for 48 Kreutzer per fathom. The operation was handed over to the raftsman Primik. After the unloading of the charcoal in Lippitzbach the rafts were re-loaded with iron hardware and went on to Maribor and Cilli. In 1858 again delivery contracts concerning wood and charcoal were negotiated with the raftesman Primik, as the final costs of the rafted charcoal were considerably lower than those of the charcoal being brought overland from the vicinity:[48] Thus, continually charcoal kilns were smoking at Oberdrauburg, but also at Flaschberg and near Stein. Voluminous storehouses for charcoal arised at Oberdrauburg and Feistritz, which usually was determined for the iron industry at Lippitzbach.

3.3.3. Timber trade

A charter from 1468 emphasizes the trade with timber, where King Matthias Corvinus had interdicted the collection of duties for trunks of hardwood and planks, which were brought to Varazdin on the Drava.[49] A further evidence is the toll for floorboards and wood in 1528 installed by Siegmund von Dietrichstein in Paternion concerning wood being floated to Villach.[50] The administrator of the Dominium Paternion justified the toll for wood with the fact that after the fire in Villach many residents had reinforced the cutting of wood in the forests which they sold downriver. The introducing of a new

[47] KLA: Graf Egger'sche Gewerkschaft St. Georgen a. L. Fasz CXVII, Nr. 141.

[48] Johann Elisabeth 2018. Ferdinand Franz Emanuel Viktor Graf von Egger. Gewerke – Grundherr – Musiker – Naturenthusiast. In: Walburga Litschauer/Wilhelm Wadl (eds) Forstgut Saualpe. Vom Gutshof des Stiftes Griffen zum nachhaltigen Forstbetrieb. Verlag des Kärntner Landesarchivs: Klagenfurt: pp 95-108.

[49] Leskoschek 1972, Schiffahrt und Flößerei, p 116.

[50] KLA: Herrschaft Paternion, Fasz. 108/195.

instruction and regulation should contribute to avoiding an overexploitation of the forests. The toll for floorboards would not suffer by this.

In the late Middle Ages and the Early Modern Times, the timber trade played no special role in the export of Carinthia, in contrast to the iron trade; however according to the official register of exported iron products from 1562 a 200.000 hundredweight of iron were sold to Italy. As for the operation of hammermills, forges and blast furnaces and also for the glass foundries wood for carbonizing fuel wood and cinder wood was needed in great amounts the demand of the particular industries was marked out by forest regulations. The home requirement of the country was considerable and the dedications for carbonizing for the different plants were a reason for the prochain to sell to foreign countries.[51]

In the 16th century occasionally the timber trade already was in the hands of various contractors, as e.g. Lorenz Mutzki from Muta (*Hochmauthen*). He bought the rafts coming down from Carinthia on the Drava, including the cargo which contained of shingles, boards and ironware, and continued the rafting to Maribor and Ptuj, as noted in a report on lost tolls in 1584.[52] Already in the 17th century the Salzburgian Dominium in the Möll-valley and the Dominium Porcia in the Drava-valley were desirous to sell all the wood which was expendable. This was the reason why they negotiated multiple cutting contracts with Venetian timber merchants, especially about the delivery of timber for shipbuilding.[53] Nearly all villages of Upper Carinthia being located on the rivers sold their wood downstream, so that the competent authorities often had to limit the rafting, as the forests nearby the rivers were completely destroyed.[54] Trunks, sawn timber and fuel wood were either rafted on the Drava from Upper Carinthia to Croatia or were pulled ashore at Villach and transported overland to Italy.

The main wharfs for the landing and the departure of the rafts and also big transshipment points in Carinthia were situated in Oberdrauburg, Waisach, Mauthbrücke, Villach, Rosegg, Feistritz, Hollenburg, Unterferlach, at the bridge at Stein, Völkermarkt. Lipitzbach, Lavamünd and Dravograd.[55] In 1744 just from the Dominium Greifenburg 49 rafts with charcoal, seven with shingles for roofs (16.000 pieces), four rafts with planks (500 pieces), two rafts with 35 trunks of larch each, eight rafts with wood, altogether 70 rafts went downstream. The carrying out of the transport was here done partly by farmers, partly by masters of rafts.[56] In 1822, as seen in an appeal for the magistrate of Ptuj from the 1st of July, there were masters of ships or rafts in Villach, Maribor and Ptuj.[57] In the middle of the 19th century Josef Winkler was a master of rafts in Steinfeld, who also produced flat boats. Rafts also were tied up at Steinfeld and at Radlacb, where a loading area for charcoal existed.[58]

From the middle of the 18th century onwards the residents of the Dominium Paternion in Upper Carinthia were allowed to harvest their own wood and, after payment of the toll, raft it to Klagenfurt for the supply of its citizens.[59] Either the farmers rafted the wood themselves or they assembled collective shiploads. Often, however, as far as it was permitted, timber and firewood were sold to raftsmen, who had to be authorized and had to pay the exact prescribed price. They then sold their cargo in Klagenfurt on their own account. To avoid rivalry the wood had to be standardized, i.e. the permissible length, width and diameter were precisely prescribed by the dominium. In this way not only firewood was transported, but also all kinds of timber and boards, which were then sold at officially fixed prices at the timber yard at Klagenfurt. In the 18th century the wood traders Khochler von Jochenstein and the brothers Mohr also took over the wood supply of Klagenfurt, as they bought wood in Upper Carinthia, floated or rafted it down to Rosegg, then transported it over land to Velden and shipped it across the

51 JOHANN 1968, Geschichte der Waldnutzung in Kärntnen: 54-56.
52 Leskoschek 1972, Schiffahrt und Flößerei, p 122.
53 Kammer der gewerblichen Wirtschaft in Kärnten 1953, Kärntens gewerbliche Wirtschaft, p 176
54 KLA: Archiv Paternion, Fasz. 108/195
55 Hermanitz 1865, Die Drava und ihr Flußgebiet, p 321.
56 Zeloth, 2010, Wirtschaft und Gesellschaft in der Marktgemeinde Steinfeld 2010: pp 101-164.
57 Leskoschek 1972, Schiffahrt und Flößerei, p 136.
58 Zeloth, 2010, Wirtschaft und Gesellschaft in der Marktgemeinde Steinfeld 2010: pp 101-164.
59 Zeloth, 2010, Wirtschaft und Gesellschaft in der Marktgemeinde Steinfeld 2010: pp 101-164.

Figure 7 *Wooden boom to stop the floated timber, Möll-valley (Mölltal) at the beginning of the 20th century. Source: Archive Forest enterprise Lainach*

Wörthersee to Klagenfurt. In 1755 not only at Klagenfurt but also at Villach a timber yard was established at the bank of the Drava, so that the fuel wood, having been floated downriver and offered for sale, or perhaps having been directly ordered by people, could be measured in Viennese fathoms by an authorized trusted person and that subsequently the price could be stipulated correctly.[60]

As the available amount of wood in the province of Carinthia was barely sufficient to meet the mining industry's needs for charcoal according to a contemporary report from the year 1812 the transit trade down the Drava was not important though the Carinthians themselves had an important trade with sawn planks and wood within their country.[61] However, after the gradual substitution of charcoal by mineral fuels, exporting wood abroad became an essential factor in trade in general and one of the most important fundaments of the Carinthian domestic in the second half of the 19th century. Not only the prosperity of different forest enterprises but also that of many industries depended on it. Usually timber traders with short term felling contracts took over these deliveries. In many cases they provided themselves the harvesting, transport and export of wood. This was the common way of timber sale. But partly also forest owners operated the cutting and selling themselves, mainly when they tried to cause as few damages as possible in the forest stands and plantations.

In the second third of the 19th century the slowly developing timber trade and the resulting rise in prices gradually put pressure on the few iron plants still active in the Möll-valley, because not only private forest owners, but also the state wanted to leave the forests to Italian timber traders for exploitation.[62] At the beginning of the third decade of the 19th century a trading company of Trieste (*Triestiner Handelsgesellschaft*) was active in the district Stall with about 40 to 50 loggers. They logged all kinds of wood which they wanted in the forest located in the Lainach-canyon where former the state-owned zinc plant had obtained its wood, sawed it at three sawmills, which they had erected for this purpose, and rafted or floated it down to Möllbrücke (see figure 7). The time-span and the extent of these logging operations was not determined, they should be continued as long as there was suitable wood for felling available. At that time, the sale of commercial timber to the lumber merchants, who were active everywhere, was already carried out in many places of the Villach district by private forest owners, in particular by the manor Porcia. Particularly the forests being situated near the Drava and Möll were exploited.[63]

Until the opening of the railway through the Kanaltal in 1879 the wood was rafted on the Drava to Maribor, reloaded on the railway and further tranported to Italy. At the end of the 1860ies all wood reserves not needed for domestic use were sold downriver to Hungary, as long as the forest areas there and in Bosnia were not yet accessible.[64] Around the middle of the 19th century about 200 flat boats arrived per year in Lower Carinthia, from which charcoal, planks etc. were unloaded at the timber yard

[60] JOHANN 1968, Geschichte der Waldnutzung in Kärntnen: p 176.
[61] Leskoschek 1972, Schiffahrt und Flößerei, p 133.
[62] KLA: Finanzdirektion Klagenfurt, Rechnungsdepartement, Schachtel 25, 2318/0.
[63] KLA: Finanzdirektion Klagenfurt, Rechnungsdepartement, Schachtel 26, 1083/0.
[64] Kammer der gewerblichen Wirtschaft in Kärnten 1953, Kärntens gewerbliche Wirtschaft, p 352.

at Feistritz and the Hollenburg. Here, as well as at Villach, and Lippitzbach, the flat boats were sold at 50 to 60 Gulden apiece to the factories, which used them to upload their products as e.g. different hardware, steel, tin, white lead, lead monoxide, minium and shot, to take them to Maribor, as a main trading place for the Drava downstream areas.[65] Traffic on the Drau was therefore extremely beneficial. Depending on the water level the load of one flat boat was 200 to 300 hundredweight, on the average 250 hundredweight. Thereafter, every year 200 flat ships altogether loaded with 50,000 hundredweight of different goods were shipped from the Hollenburg and its surroundings down to Maribor. Because of its connection with the railway network Maribor was an important transshipment center. In Maribor the remaining flat boats were sold, and received a new Styrian crew. Four of the Carinthian boats were joined to one vessel, re-loaded with fruit, boards and other freight and continued its journey to Hungary with its last destination Osjiek.[66]

In 1876 for the Möll and in 1891 for the Drava regulations concerning the rafting were issued in Carinthia. They regulated the time when it was allowed to use rafts and defined special parameters.[67] In the 19th century the navigation with rafts and flat boats was so lively that even the establishment of steam navigation from Maribor to Villach was discussed. However, the grant of a permission to establish a railroad put an end to the already ordered navigability plans of the Drava.[68] In 1870, with the establishment of an own forestry management administration of the Hüttenberger Iron-Company (*Hüttenberger Eisenwerksgesellschaft*), traffic on the Drau was reorganized by the organization of charcoal transport to Hüttenberg. With the construction of the railway in 1871, the transport with flat boats decreased and came to a standstill, while rafting to Villach continued. Many of the rafts arrived from the wooded Möll-valley. Here the rafting route started at Fragant. Up to this place the wood was floated, there gathered in a boom and tied up in rafts, which then continued to the Drava. On this route on average 3500 cubic meter per year on 300 rafts were rafted to the Drava (see figure 8). Subsequently the rafted amount had to be reduced, not to endanger the sustainability in the forest.[69]

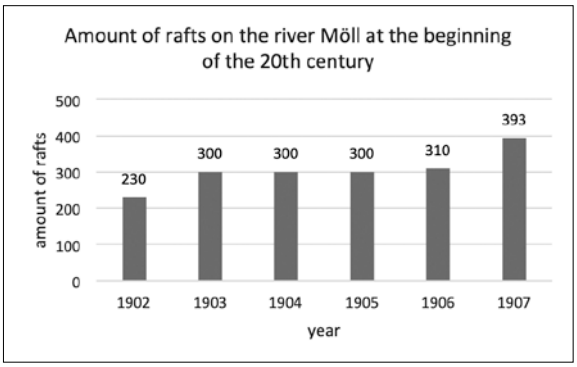

Figure 8

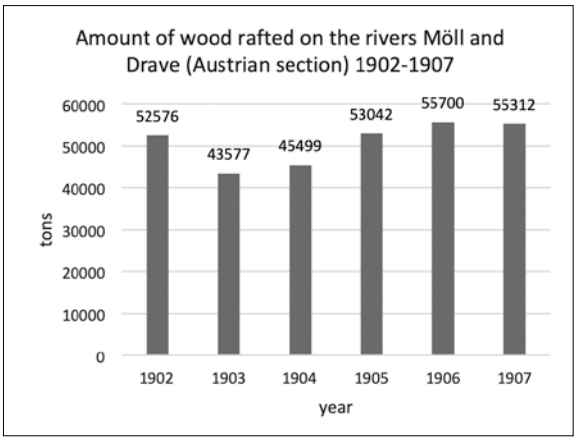

Figure 9

It was impossible for me to compile a time series about the raft traffic on the Drava with regard to the amount of the rafts as well as with regard to the amount of the rafted wood. The different locations of manufacturing the rafts (Möll-valley, Drava-valley), the either long or very short distance to the customer as well as the different buyers and sellers of the wood along the river, the different contractors conducting the rafting, the further loading of rafts and flat boats on the way are only a few of the influencing factors which are very important but difficult to assess. With regard to the amount of wood a multitude of flat

[65] Scheließnig. 1842. Der Dravastrom und seine kommerzielle Wichtigkeit, p 182 ff.
[66] Haßler, 1921. Die Floß- und Plättenschiffahrt, p 7.
[67] Haßler, 1921. Die Floß- und Plättenschiffahrt, p 10.
[68] Leskoschek 1972, Schiffahrt und Flößerei, p 139.
[69] Haßler, 1921. Die Floß- und Plättenschiffahrt, p 11.

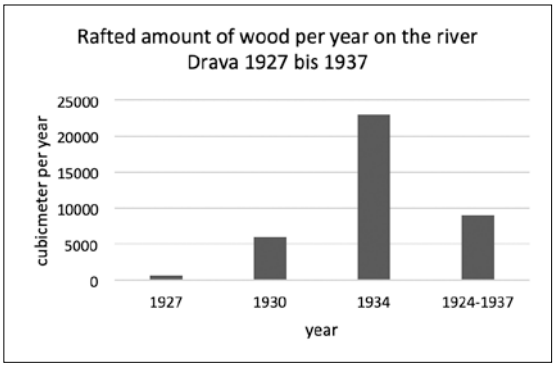

Figure 10

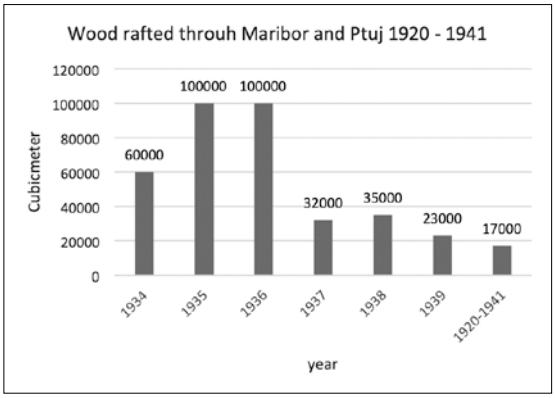

Figure 11

boats would have to be added, for which also no reliable figures are available, as they were operated privately. That is why only points of reference can be provided for the amount of raft traffic (see figure 9).

Up to the 20th century in Lower Carinthia the Drava between Glainach and Dravograd was one of the more strongly used river stretches. In Lavamünd in 1901 203 rafts landed, in 1907 170 and in 1909 still 203 rafts.[70] On the upper course of the Drava upstream Spittal there were 1907 rafts per year, upstream Feistritz an der Drau 790 rafts per year.

During the First World War and the Postwar Period the traffic on the water was much affected. In 1920 infrequent applications for grants for rafting on the rafting stretch in Upper Carinthia were again placed; as a result, a lively development came into being. In the individual years the amount of wood fluctuated because of economic conditions (1927 650 m³ wood, 1930 6000 m³ timber and pulp wood, 1934 23.000 m³ wood because of the purchases of the cellulose plant at Villach St. Magdalen) (see figure 10).[71]

Taking a closer look at the years between 1920 and 1925 about 2500 m³ on 100 to 125 rafts were delivered just alone to the Willroider sawmill at Villach. In addition to that the cellulose plant Magdalen obtained up to 15.000 m³ pulp wood per year from the Upper Drava- and Möll-valley. Between 1924 and 1937 about 120.000 m³ wood on 3700 rafts were brought down from the Upper Drava-valley to Spittal and Villach. Other important companies which operated the rafting of timber autonomously were the company Jakob Hasslacher at Sachsenburg, and the companies Fratelli Feltrinelli and Drauland at Spittal.[72] From 1945 onwards the transport on the water decreased considerably and stopped completely in Carinthia in 1950. The reason for this was the switch to truck transport and the expansion of power plants on the Drava in the 1960ies of the 20th century.

Up to the Second Word War the rafting on the Drava kept its importance for Maribor and Ptuj as well (see figure 11). In 1934 still 2000 rafts a year passed by Maribor and Ptuj, and in the years or economic recovery from 1935 to 1939 100.000 m³ wood a year passed Maribor. From 1920 to 1941 about half a million stacked cubic meter wood was rafted and 7 million vineyard stakes. In 1938 alone 1167 rafts with altogether 333.260 boards, 444.000 pieces of construction timber, 1145 pieces of logs and 67.000 bunches of vineyard stakes at 1000 pieces each were transported downstream the Drava. In June the same year there were 192 rafts and this was the peak of the trade. In 1939 only 757 rafts passed Maribor, where in 1937 still 1065 had been counted.[73]

[70] Zeloth Thomas 2016. Landschaft, Natur-, Kultur- und Lebensraum der Gemeinde Ruden. In: Wilhelm Wadl und Thomas Zeloth (Hg), Ruden. Natur- Geschichte-Kultur, Verlag des Kärntner Landesarchivs Klagenfurt: p 58.

[71] Moser, 1972, Von den Drautaler Flößern, Heft 6: 7.

[72] Zeloth 2010, Wirtschaft und Gesellschaft in der Marktgemeinde Steinfeld, pp 101-164.

[73] Leskoschek 1972, Schifffahrt und Flößerei, p 140.

4. EFFECTS ON THE LANDSCAPE

In the period of industrial growth at the beginning of the 19th century the high demand for charcoal of forges, furnaces and hammermills and the growing need for commercial timber resulted the over-exploitation of forests even in those regions which were not situated in direct proximity to industries with high energy requirements. The management of nearly all the forests along the Drava and the Möll in Upper Carinthia had focused on the production of charcoal, thus, quite a few calm canyons of Carinthia developed to raging torrential streams after excessive cutting of wood. As it happened with the already cited Pirker torrential stream. After its exit from the Pirkbach-canyon (so-called *Pirkbachgraben*) it poured forth with a little gradient and nearly without depression of its stream channel into the Drava. Its banks were unprotected. In its bed immense gravel bulks had accumulated. In search of the cause of the increasing danger of flooding, an on-site inspection which was carried out by wish of the municipality of Flaschberg in 1852 showed that there were huge clear-cuts along the whole canyon, which were only partially stocked with meagre forest re-growth. There were also significant landslides. Since the last forest harvesting, which was about 20 years ago, the areas had rejuvenated with larch. However, because of the very frequent avalanches in winter, these rejuvenations were repeatedly affected. There were many tributaries in the canyon that supplied gravel. Here since the last logging many trunks had been left behind and formed barriers. Bank protection structures were therefore considered to be extremely necessary to protect the surrounding areas, namely the villages. The municipality Flaschberg was of the opinion that either the state as a former owner of the zinc plant Dellach or the Count Egger works would have to pay due to existing old contracts. Documents found in the municipality showed that the zinc plant had in turn expanded the bed of the creek to allow the floating, but had contractually agreed to restore everything to a proper condition after the floating. But as this statement was based mainly on verbal interrogation of old people the on-site inspection ended without a definite result about who had to carry the costs.[74]

Figure 12 *Destroyed dams, Möll-valley around 1882. Source: KLA, Bildarchiv Ferdinand v. Staudenheim Kärntens Wildbäche 1886, kleine Kassette Nr. 88.*

Figure 13 *Flooding of the Möll-valley 1882 caused by heavy rain and over-utilization of the forests 1882. Source: KLA, Bildarchiv Ferdinand v. Staudenheim: Kärntens Wildbäche 1886, kleine Kassette Nr. 81.*

For the landowners the necessary investments for the construction of suitable bank protection buildings were considerable high. Nearly everywhere the floating was the reason for the damages (see figure 12). Thus, the damage to the bank protection buildings and the adjacent field of the landowner Peter Egger in the Möll-valley was caused by the fact that the wood having been stored at the doom, and which had been put up for sale,

[74] KLA: Graf Eggersche Gewerkschaften St. Georgen a. L., Fasz. CXVII, Nr. 141, Holzschwemmung auf der Drau in Oberkärnten 1805-1852.

had been washed away and later got stuck at the bank. If it could be proved that the floating actually damaged bank protection structures, the person who had caused the damage had to pay compensation. This was regulated in the act for floating and rafting of wood for the river Möll (*Holzschwemm- und Floßfahrordnung für den Möllfluss)* from April 14th, 1876.

The company Fratelli Feltrinelli e.g. had to pay such a compensation, when poles and logs, having been left behind after the end of the floating of the current year, got blocked and caused material damage to the plots along the bank of the parish St. Georg in Stall during a flood in October 1889.[75] Also in the Moll-valley extensive clearings, having resulted from forest utilization for the iron industry and the timber trade, needed substantial afforestation, but at the beginning only minor resources were used.[76]

It was not until 1882 that catastrophic floodwaters affected the entire region badly, and that the damage to both the public and the private estates were perceived not only locally but also transregionally. (see figure 13). There was a political rethink. A comprehensive rehabilitation program was initiated, which led both to the reforestation of the cleared areas and the stabilization of the slopes, as well as to the regulation of the Carinthian Drava and to the management of catchment areas for the torrents in the canyons. Reforestation and flood prevention together with appropriate structural measures became the focus of the statute of 1884.[77]

Figure 14 *Construction of rafts in former times and today. The transfer of knowledge to the descendants. Source: J. Kuhn*

5. RAFTING ON THE UPPER DRAVA RIVER – AN IMPORTANT PART OF THE CULTURAL HERITAGE

Because of its long history, tradition and economic as well as sociocultural importance the rafting in the Upper Drava Valley has to be seen as part of the Cultural Heritage of the region. Despite of a time of a certain stagnation in the second half of the 20th century the knowledge referring to the traditional craftsmanship of building rafts as well as the practices in performing the rafting also related to nature and its dangers has survived. This knowledge always has been passed on orally from generation to generation. Since 1990, there is the society of the »Friends of the rafting of the Upper Drava Valley*« (Freunde der Oberdrautaler Flößerei)* who has set itself the goal not only to let the long tradition not be forgotten, but to pass on the technique of raft binding and driving to the younger generation.

Six villages, located along the bank of the Drava in the Upper Drava Valley, are members of this society: Oberdrauburg, Dellach, Berg, Greifenburg, Sachsenburg and Spittal-Baldramsdorf. Every year in August, the association organizes

[75] Archiv FV Lainach. Schreiben der Bezirkshauptmannschaft Spittal am 20. September 1893 an die Firma Fratelli Feltrinelli und der Firma Wirth zur Kentnnisnahme.

[76] Archiv Österreichische Bundesforste 1884-1893. Betriebsoperat vom k.k. Wirtschaftsbezirk Obervellach

[77] Haßler, 1921. Die Floß- und Plättenschiffahrt, p 8.

the »Rafting Days of the Upper Drava Valley« (so called *Oberdrauburger Flößertage)*, where each village builds a complete raft in the traditional way. In three days and five stages six rafts drive together a track length of on the whole 55 km. The joint raft trip brings to life the tradition of raftsmen, who have shaped the region's economic life for so many centuries and the youth are encouraged to learn the building of rafts, the technique of rafting and thus to continue the tradition. In 2014 this tradition was incorporated in the Austrian National List of the UNESCO World Cultural Heritage.

SAŽETAK

Do završetka Južne željezničke pruge (Südbahnstrecke) 1871. rijeka Drava imala je vrlo veliki gospodarski značaj za Koruško, a posebno za unutarnju trgovinu, kao i za izvoz u susjedne strane zemlje smještene nizvodno. Bila je to značajna veza Istok – Zapad: između Koruške, Slovenije, Hrvatske i Mađarske. U samoj Koruškoj predstavljala je vezu između šumovitih područja u gornjem toku rijeke Drave s područjima u Donjoj Koruškoj, koja su imala manje drveta, ali su bila industrijski razvijena, i dalje s panonskom gospodarskom sferom. Izvoz drva, što se može dokazati već u 14. stoljeću, pretrpio je opetovana ograničenja krajem 18. stoljeća, kada su ukinuta ograničenja. Naknadno je, međutim, promet splavova i čamaca s ravnim dnom (tzv. Plätten) procvjetao, opskrbljujući poduzeća drvoprerađivača u Donjoj Koruškoj drvenim ugljenom, a pilane u donjem toku rijeke Drave s okruglim drvom. Luke u Jadranskom moru je opskrbljivao s drvećem za gradnju brodova. Promjenom rijeke Drave u svrhu proizvodnje električne energije, kao i s prelaženjem prometa sa splavova na željeznički promet, dolazi do kraja splavarstva na Dravi nakon Drugog svjetskog rata.

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